IDENTIFYING TECHNICAL ORDER

This ITO replaces ITO 35C1-2-178-1 dated 13 January 1966 and commercial manual, Not Dated

1. PURPOSE. This technical order is issued for the purpose of identifying and authorizing for official use a commercial publication identified as follows:

CONTRACTOR--- **General Radio**

COMMERCIAL NUMBER--- **Type 1201-C, -CQ18**

TITLE--- **Operating instructions-Unit Regulated Power Supply**

DATE--- **Not dated**

ADDITIONAL IDENTIFICATION:

2. FILE LOCATION. The above listed commercial publication is filed in

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3. SUPPLEMENTARY INFORMATION. The information contained in the above listed commercial publication is supplemented as follows for official use.

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20 MAY 1975

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

This technical order issued by SAAMA (SANST)

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OPERATING INSTRUCTIONS

T.O. 35C1-2-178-1
3 MAY 1967

TYPE 1201-C, -CQ18

UNIT REGULATED POWER SUPPLY

GENERAL RADIO COMPANY

Figure 1-1. Panel view of the Type 1201-C Unit Regulated Power Supply. The Type 1201-CQ18 is identical in appearance except for type number and input data silk-screening.

SPECIFICATIONS

Input: Type 1201-C – 105 to 125 volts; Type 1201-CQ18 – 195 to 235 volts or 210 to 250 volts; 50 to 60 c/s, 90 watts full load nominal line voltage. Also can be operated from 400-cycle supply if 400-cycle, 6.3 volt output can be tolerated.

Output: 300 volts dc regulated at 70 milliamperes maximum; 6.3 volts ac unregulated at 4 amperes maximum.

Regulation: ±0.25% with maximum line and load variations combined.

Ripple: Less than 1 millivolt, rms, 120 c/s, at full load.

Connectors: Three-wire cord permanently attached. Standard 4-terminal receptacle mounted on cabinet side for convenient connection to Unit instruments.

Accessories Supplied: Mating plug for equipment other than Unit instruments, spare fuses.

Cabinet: Unit instrument.

Dimensions: Width 5, height 5¾, depth 6¼ inches (130 by 150 by 160 mm), over-all, not including power cord.

Net Weight: 6 pounds (2.8 kg).

Shipping Weight: 11 pounds (5 kg).

1. INTRODUCTION.

1.1 PURPOSE AND DESCRIPTION.

The Types 1201-C and 1201-CQ18 Unit Regulated Power Supplies (Figure 1-1) are designed to provide a source of regulated power for other Unit instruments. They can also supply instruments other than those of the Unit line by means of a mating connector provided.

Both power supplies provide 300 volts dc at a maximum of 70 milliamperes and 6.3 volts ac at a maximum of 4 amperes. They are recommended in applications that require low ripple voltage and constant input voltage.

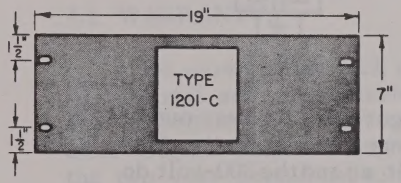
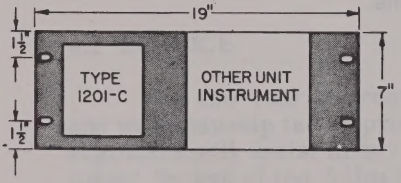
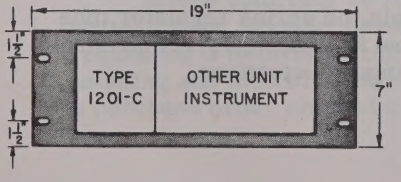
2. OPERATING PROCEDURE.

2.1 RELAY-RACK MOUNTING.

If desired, the Type 1201-C can be rack-mounted by use of the appropriate adaptor panel as listed in Table 2-1. The panels are finished in charcoal-gray crackle paint to match the instrument panel.

TABLE 2-1

RELAY-RACK ADAPTOR PANELS

Type	Description	Code Number
480-P4U1 	Relay-Rack Adaptor Panel used to rackmount the Type 1201-C alone.	0480-9984
480-P4UCS1 	Relay-Rack Adaptor Panel used to rackmount the Type 1201-C with a Type 1208-C, 1209-C, 1209-CL, 1211-C, 1215-C, or 1361-A.	0480-9448
480-P4U3 	Relay-Rack Adaptor Panel used to rackmount the Type 1201-C with a Type 1206-B, 1210-C, 1212-A, 1213-D, 1217-C, or 1220-A.	0480-9986

2.2 AC-LINE CONNECTIONS.

The Type 1201-C is wired to operate from an ac line of 105 to 125 volts. The Type 1201-CQ18 is normally wired to operate from an ac line of 195 to 235 volts but it can be changed to operate from 210 to 250 volts as follows (see Figure 2-1):

a. Locate the three connections to the primary of the power transformer, T1 (all three are on the front of the transformer, toward the outside edge).
b. For 210 to 250-volt operation, move the red lead from the lower primary tab to the upper one.

2.3 INTERUNIT CONNECTIONS.

If the power supply is to be used with a Unit instrument, plug the Unit instrument into the four-terminal connector (SO1, shown in Figure 2-2) on the right-hand side of the power supply.

If the power supply is to be used with equipment other than Unit instruments, use the mating connector provided. Terminal numbers are shown in Figure 2-2 and are also marked on the socket.

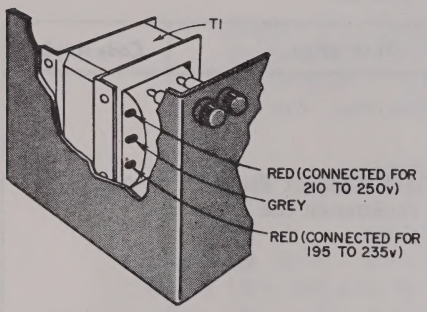


Figure 2-1. To change ac line requirements of Type 1201-CQ18, interchange red wire on power transformer.

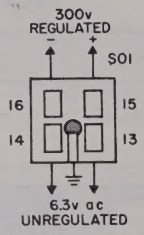


Figure 2-2. Power output connector. Both the 6.3-volt ac and the 300-volt dc supplies are isolated from ground to give greater latitude in external connections.

3. PRINCIPLES OF OPERATION.

3.1 GENERAL.

A full-wave voltage doubler with silicon rectifiers provides the input voltage for the series regulator. The output voltage, through a voltage divider, is compared with a zener reference diode by means of a cascode amplifier. The amplified error voltage controls the series regulator tube to provide constant output voltage. An additional feedback loop, comprising R533, R538, and R531, reduces the effects of input fluctuations.

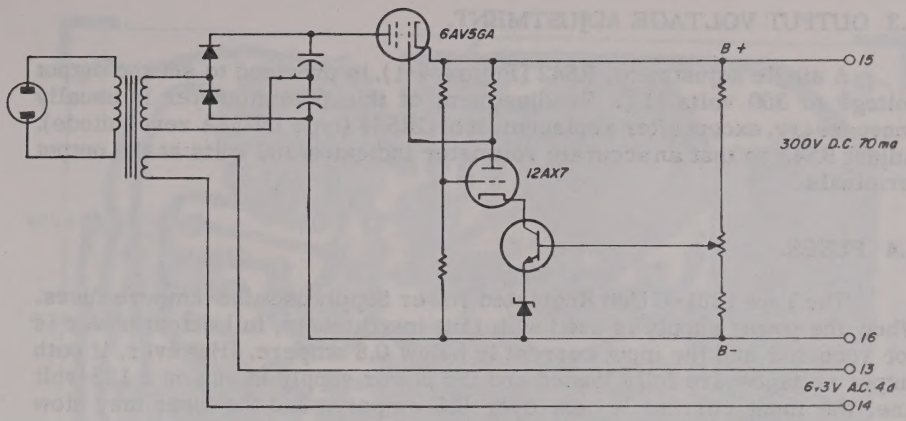


Figure 3-1. Elementary schematic diagram of the Type 1201-C and Type 1201-CQ18 Unit Regulated Power Supplies.

4. SERVICE AND MAINTENANCE.

4.1 WARRANTY.

We warrant that each new instrument sold by us is free from defects in material and workmanship, and that, properly used, it will perform in full accordance with applicable specifications for a period of two years after original shipment. Any instrument or component that is found within the two-year period not to meet these standards after examination by our factory, sales engineering office, or authorized repair agency personnel, will be repaired or, at our option, replaced without charge, except for tubes or batteries that have given normal service.

4.2 SERVICE.

The two-year warranty stated above attests the quality of materials and workmanship in our products. When difficulties do occur, our service engineers will assist in any way possible. If the difficulty cannot be eliminated by use of the following service instructions, please write or phone our Service Department (see rear cover), giving full information of the trouble and of steps taken to remedy it. Be sure to mention the serial and type numbers of the instrument.

Before returning an instrument to General Radio for service, please write to our Service Department or nearest sales engineering office, requesting a Returned Material Tag. Use of this tag will ensure proper handling and identification. For instruments not covered by the warranty, a purchase order should be forwarded to avoid unnecessary delay.

4.3 OUTPUT VOLTAGE ADJUSTMENT.

A single adjustment, R542 (Figure 4-1), is provided to set the output voltage to 300 volts ±1%. Readjustment of this potentiometer is usually unnecessary, except after replacement of CR534 (type IN758A zener diode). Adjust R542 so that an accurate voltmeter indicates 300 volts at the output terminals.

4.4 FUSES.

The Type 1201-C Unit Regulated Power Supply uses 0.8-ampere fuses. When the power supply is used with Unit instruments, full output power is not required and the input current is below 0.8 ampere. However, if both output voltages are fully loaded and the power supply is run on a 125-volt line, the input current is just over 0.8 amperes and the fuses may blow after several hours. Therefore, substitute 1-ampere fuses for continuous operation at high line voltage and full load.

The Type 1201-CQ18 Unit Regulated Power Supply uses 0.5 ampere fuses which are satisfactory for all normal line and load conditions.

4.5 COVER REMOVAL.

To remove the cover, loosen the thumbscrew on the left-hand side of the cabinet and slide the cover off, away from the panel.

4.6 ETCHED-BOARD REMOVAL.

While it is possible to replace all tubes and measure all voltages without removal of the etched board, access to components requires swinging the etched board out of the instrument. Remove V531 (6AV5GA) and the two screws at the rear of the etched board (see Figure 4-1). The board will now swing out on the hinges provided. If V531 is replaced, the instrument may be operated in this position.

4.7 TROUBLE-SHOOTING NOTES.

All voltages are measured with nominal ac line voltage unless noted otherwise (i.e., 115, 215, or 230 volts; refer to paragraph 2.2 for additional details).

4.7.1 INCORRECT OUTPUT VOLTAGE.

If the output voltage is regulated and within a few volts of 300, reset R542 (refer to paragraph 4.3). If this adjustment drifts, replace R540, R541, R542, or CR534.

If the output voltage drops only at low line and full load, replace V531 (6AV5GA) and check the voltage across C1 and C2. The voltage from the positive terminal of C2 to the negative terminal of C1 should be 430 volts with full load and nominal line voltage. If this voltage is less than 420 volts, check CR532, CR533, C1, and C2.

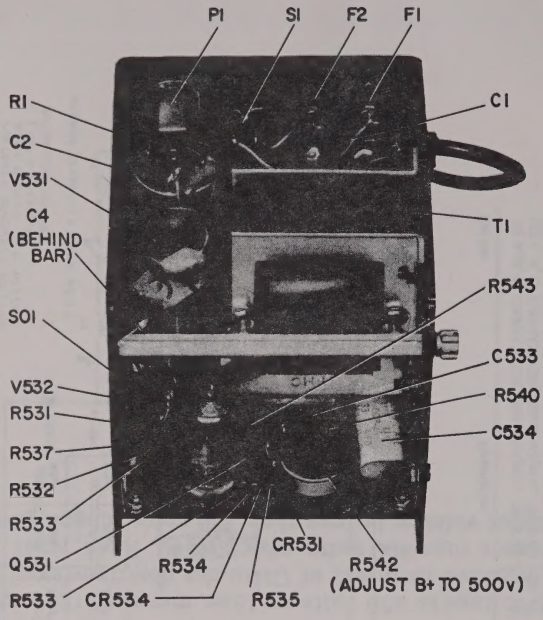
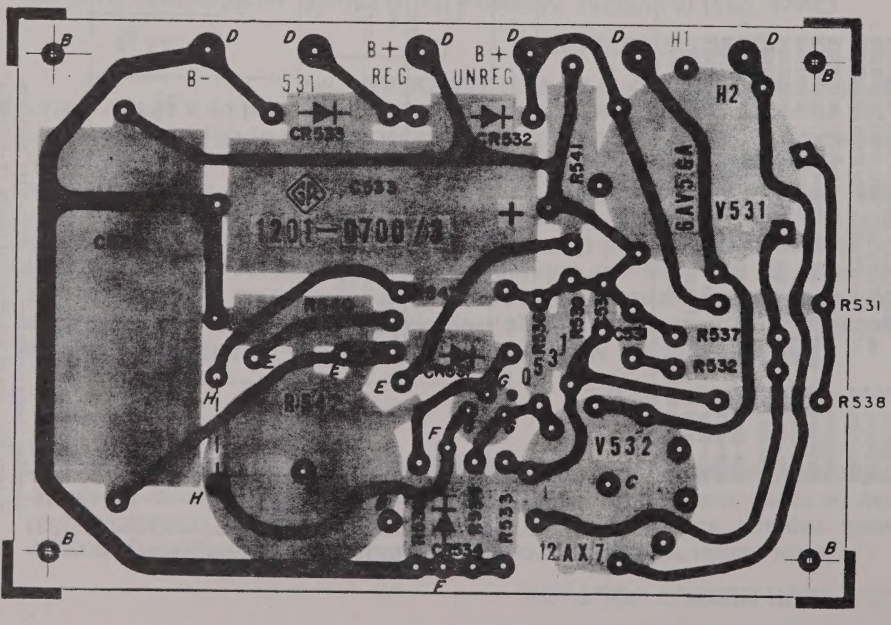


Figure 4-1. Interior view and etched-board layout.



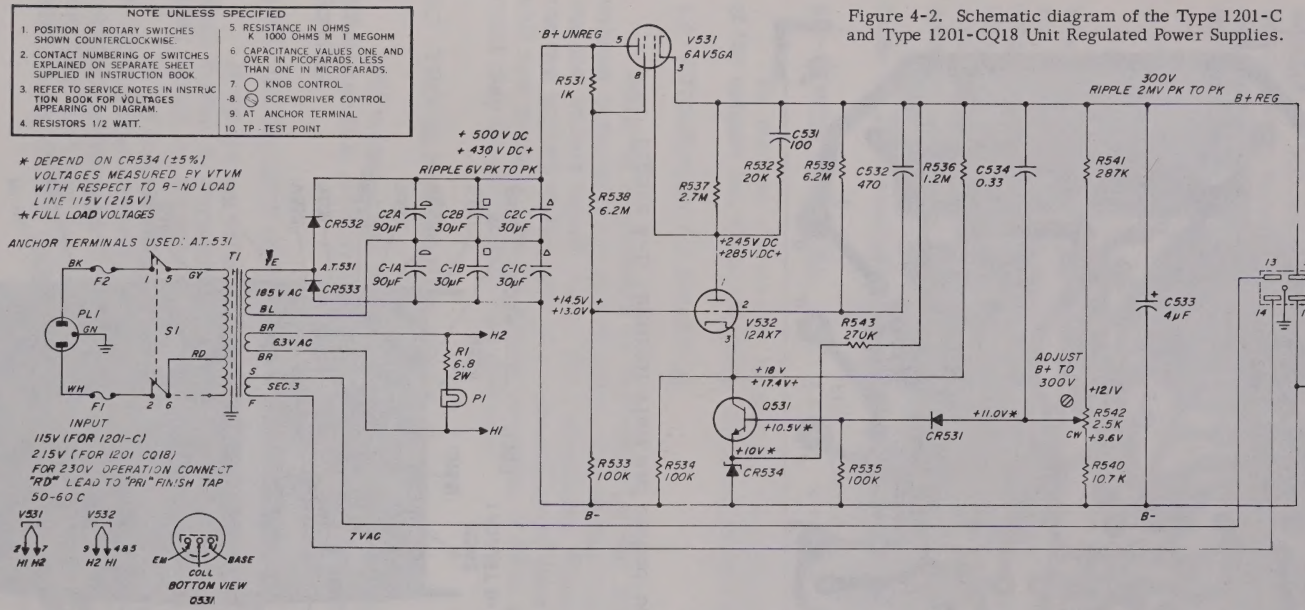


Figure 4-2. Schematic diagram of the Type 1201-C and Type 1201-CQ18 Unit Regulated Power Supplies.

PARTS LIST

Ref No.	Description	Part No.
C1 A, B, C	CAPACITOR, Electrolytic, 90 x 30 x 30 µF 300V	4450-3400
C2 A, B, C	CAPACITOR, Electrolytic, 90 x 30 x 30 µF 300V	4450-3400
C4	CAPACITOR, Ceramic, 0.01 µF ±20% 500V	4406-3109
C531	CAPACITOR, Ceramic, 100 pF ±10%	4404-1108
C532	CAPACITOR, Ceramic, 470 pF ±10%	4404-1478
C533	CAPACITOR, Electrolytic, 4 µF 475V	4450-2000
C534	CAPACITOR, Plastic, 0.33 µF ±10% 400V	4860-9700
CR531	DIODES, Type 1N3254	6081-1002
CR532	DIODES, Type 1N3255	6081-1003
CR533	DIODES, Type 1N3255	6081-1003
CR534	DIODES, Type 1N758A zener	6083-1012
F1	FUSE, for Type 1201-C, 0.8 amp 3AG slo-blo	5330-1200
	FUSE, for Type 1201-CQ18, 0.5 amp 3AG slo-blo	5330-1000
F2	FUSE, for Type 1201-C, 0.8 amp 3AG slo-blo	5330-1200
	FUSE, for Type 1201-CQ18, 0.5 amp 3AG slo-blo	5330-1000
P1	PILOT LIGHT, Mazda 44, 6.3V 0.25 amp bayonet	5600-0700
Q531	TRANSISTOR, Type 2N2714	8210-1047

Ref No.	Description	Part No.
R1	RESISTOR, Wire-wound, 6.8 Ω ±10%	part of 7510-1930
R531	RESISTOR, Composition, 1 KΩ ±5% 1/2w	6100-2105
R532	RESISTOR, Composition, 20 KΩ ±5% 1/2w	6100-3205
R533	RESISTOR, Composition, 100 KΩ ±5% 1/2w	6100-4105
R534	RESISTOR, Composition, 100 KΩ ±5% 1/2w	6100-4105
R535	RESISTOR, Composition, 100 KΩ ±5% 1/2w	6100-4105
R536	RESISTOR, Composition, 1.2 MΩ ±5% 1/2w	6100-5125
R537	RESISTOR, Composition, 2.7 MΩ ±5% 1/2w	6100-5275
R538	RESISTOR, Composition, 6.2 MΩ ±5% 1/2w	6100-5625
R539	RESISTOR, Composition, 6.2 MΩ ±5% 1/2w	6100-5625
R540	RESISTOR, Metal film, 10.7 KΩ ±1% 1/2w	6450-2107
R541	RESISTOR, Metal film, 287 KΩ ±1% 1/2w	6450-3287
R542	RESISTOR, Wire-wound, 2.5 KΩ ±10%	6050-1500
R543	RESISTOR, Composition, 270 KΩ ±5% 1/2w	6100-4275
S1	SWITCH, dpst, POWER	7910-1300
SO1	SOCKET, Receptable, four-terminal	4230-0700
T1	TRANSFORMER, for Type 1201-C	0485-4950
	TRANSFORMER, for Type 1201-CQ18	0485-4982
V531	TUBE, Type 6AV5-GA	8360-2390
V532	TUBE, Type 12AX7	8370-0900

4.7.4 HIGH OUTPUT VOLTAGE.

If the output voltage is greater than 300 volts and completely unregulated, replace V532 (12AX7). If the tube is not defective, transistor Q531 may be open. Measure the voltages at key points with a vacuum-tube voltmeter, and compare them with those given on the schematic diagram, Figure 4-2.

4.7.5 EXCESSIVE RIPPLE.

120-cycle ripple. Measure the output ripple at full load. If it is excessive only at low line voltage, replace V531 (6AV5GA). If the voltage from the negative terminal of C1 to the positive terminal of C2 is less than 420 volts at full load and nominal line voltage, replace RX1 and RX2. If the ripple across C1 and C2 is greater than 6 volts peak-to-peak (2 volts rms) replace C1 and C2. If the output ripple is excessive at all line voltages, replace V531 (6AV5GA) and check resistors R538, R533, and R534.

60-cycle ripple. If the 60-cycle ripple is excessive only at full load, one rectifier (CR532 and CR533) or one capacitor (C1 or C2) may be faulty. If the ripple is independent of the load, it may be caused by a heater-cathode short in V532 (12AX7) or V531 (6AV5GA).

4.7.2 NO OUTPUT VOLTAGE.

Check V531 (6AV5GA). Measure the regulator input voltage from the negative terminal of C1 to the positive terminal of C2. If this input voltage is zero, check for a shorted CR532, CR533, C1, C2, and a blown fuse in the primary circuit of T1. If the input voltage is normal (430-500 V), check V532 (12AX7) for an internal short. Check Q531 for a short. Measure the voltages at key points with a vacuum tube voltmeter, comparing them with those given in Figure 4-2.

4.7.3 LOW OUTPUT VOLTAGE.

If the output voltage is 250 volts or less, measure the regulator input voltage from the negative terminal of C1 to the positive terminal of C2. If this voltage is greater than 400 volts, check R540, R541, R542, and CR534. If the regulator input voltage is less than 250 volts, check CR532, CR533, C1, and C2.

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